Joseph Brignolo

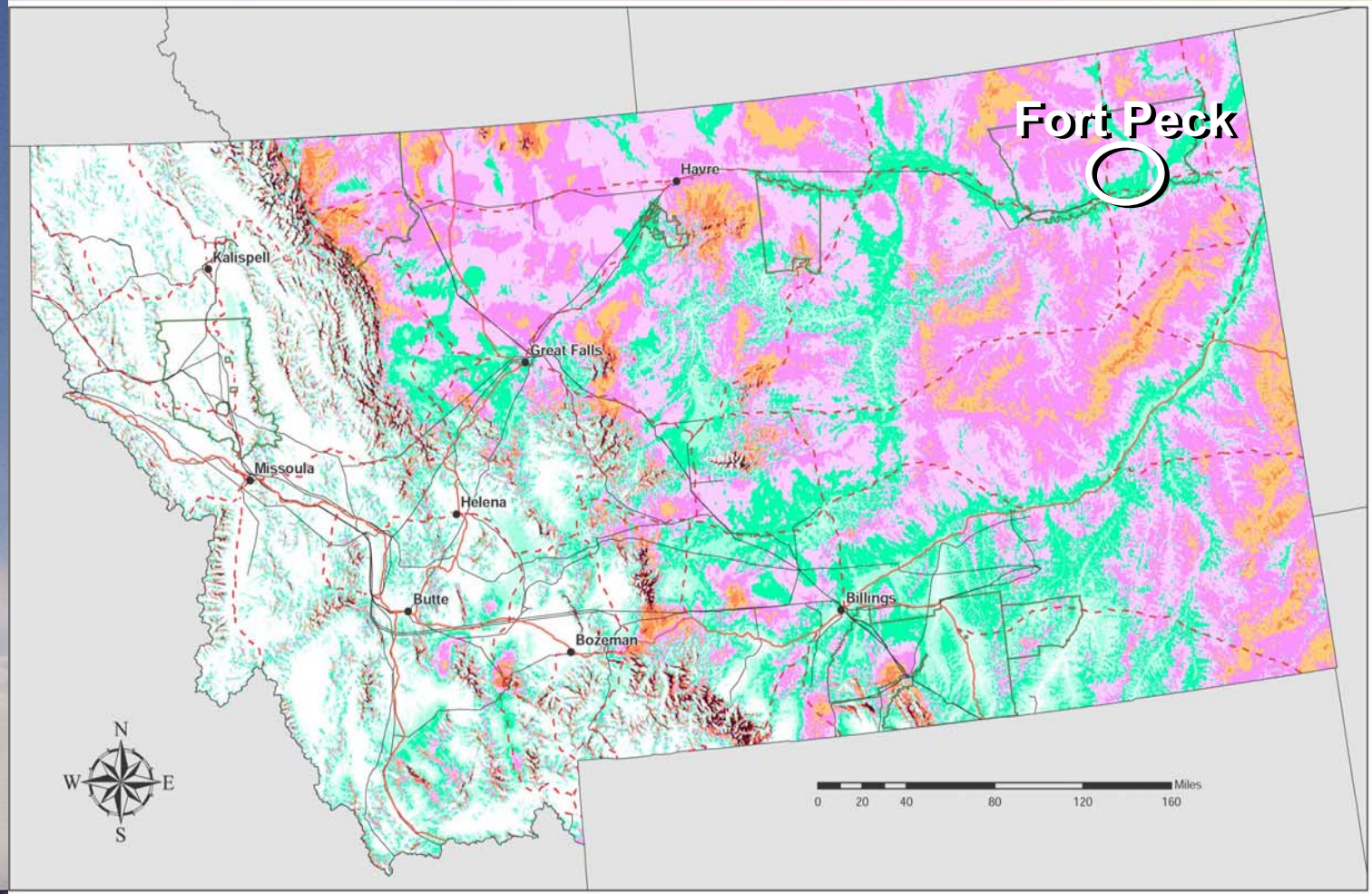
Vice President, Operations and Program Development, FAI

Project Manager/Technical Director, Fort Peck Wind Development Project


ASSINIBOINE & SIOUX TRIBES
at FORT PECK
WIND ENERGY
DEVELOPMENT PROJECT

WINDPOWERMAPS.org

Montana Wind Speed at 50 Meters



Wind Speed at 50 meters

	m/s	mph
	0 - 5.0	0 - 11.2
	5.0 - 5.5	11.2 - 12.3
	5.5 - 6.0	12.3 - 13.4
	6.0 - 6.5	13.4 - 14.5
	6.5 - 7.0	14.5 - 15.7
	7.0 - 7.5	15.7 - 16.8
	7.5 - 8.0	16.8 - 17.9
	8.0 - 8.5	17.9 - 19.0
	8.5 - 9.0	19.0 - 20.1
	9.0 - 9.5	20.1 - 21.3
	9.5 - 10.0	21.3 - 22.4
	>10.0	>22.4

- Major Cities
- Transmission Lines > 115 KW
- Limited Access Highway
- Highway
- Tribal Reservations

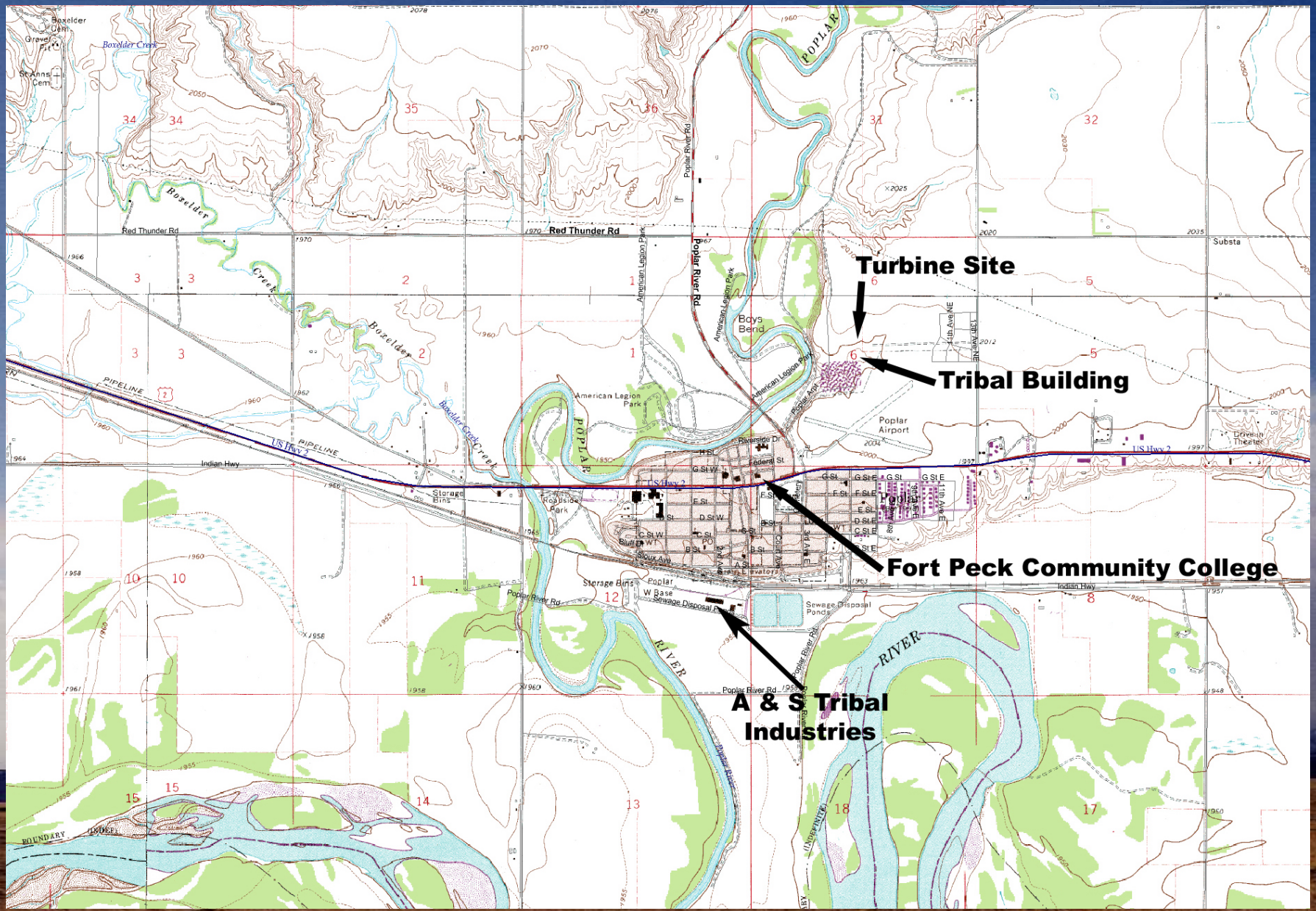
The wind resource estimates presented on this map were developed by TrueWind Solutions using MesoMap, a mesoscale atmospheric simulation system, at a spatial grid resolution of 400 meters (one-quarter mile). The estimates have been validated by the National Renewable Energy Laboratory (NREL) and independent meteorologist but should be confirmed by direct measurement according to wind energy industry standards.

Northwest Cooperative Development Center | TrueWind Solutions | Bonneville Power Administration | NREL | Northwest SEED | Integral GIS

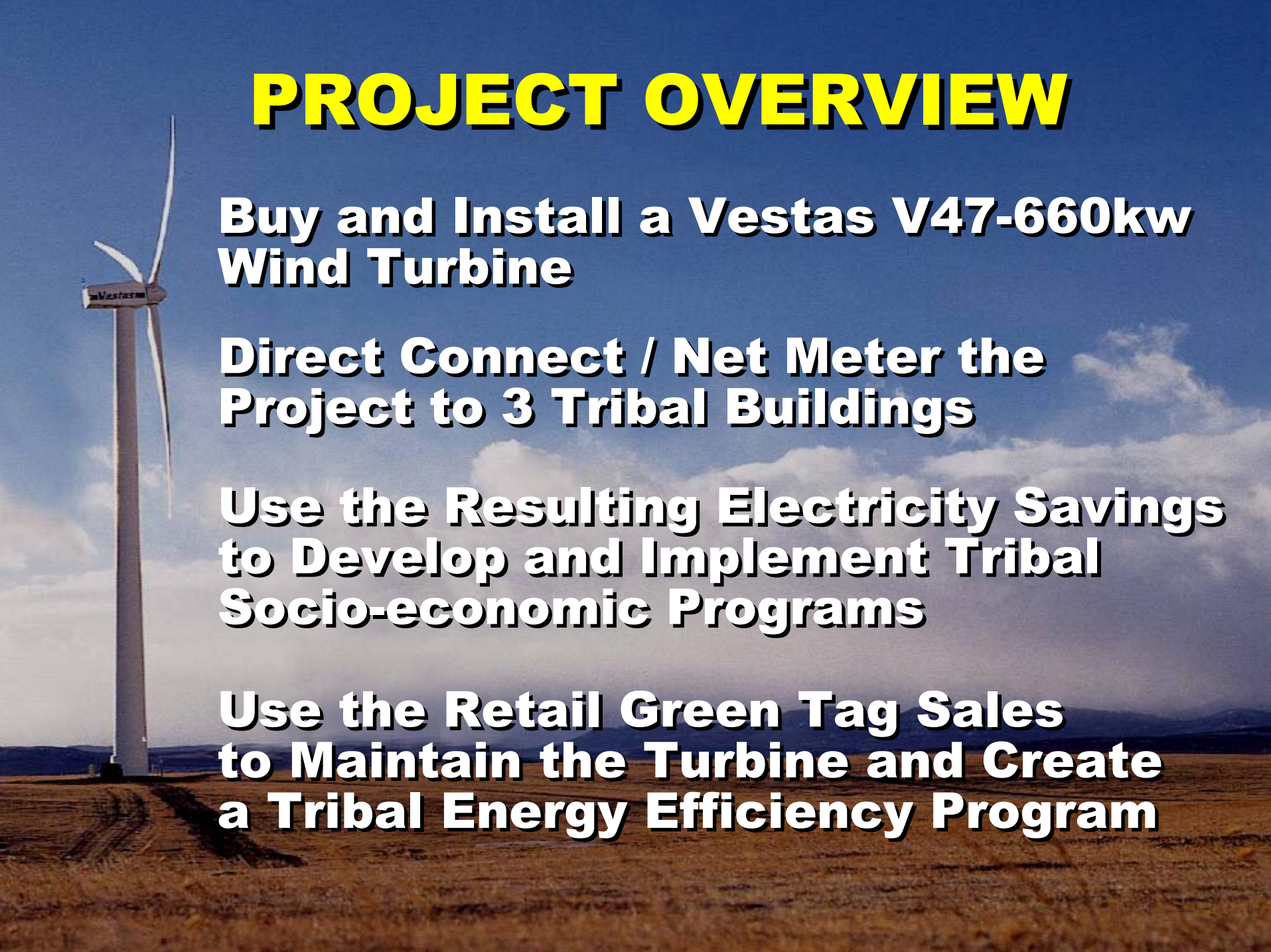
Project Sponsors

NREL, the Bonneville Power Administration, Northwestern Energy, the Wyoming Business Council, enXco, the Northwest Power Planning Council, Zilkha Renewable Energy, Klickitat County, EnronWind, ABB, Renewable Energy Systems (USA) Inc., Chelan Public Utility District, Idaho Power, Windland, Inc., WSACAA Energy Project, Vestas, Jones & Stokes, CH2M Hill, Suzlon Energy, Northwest Wildlife Consultants, Inc., and Cielo Wind Power.

For more information see www.windpowermaps.org



Foundation for the American Indian



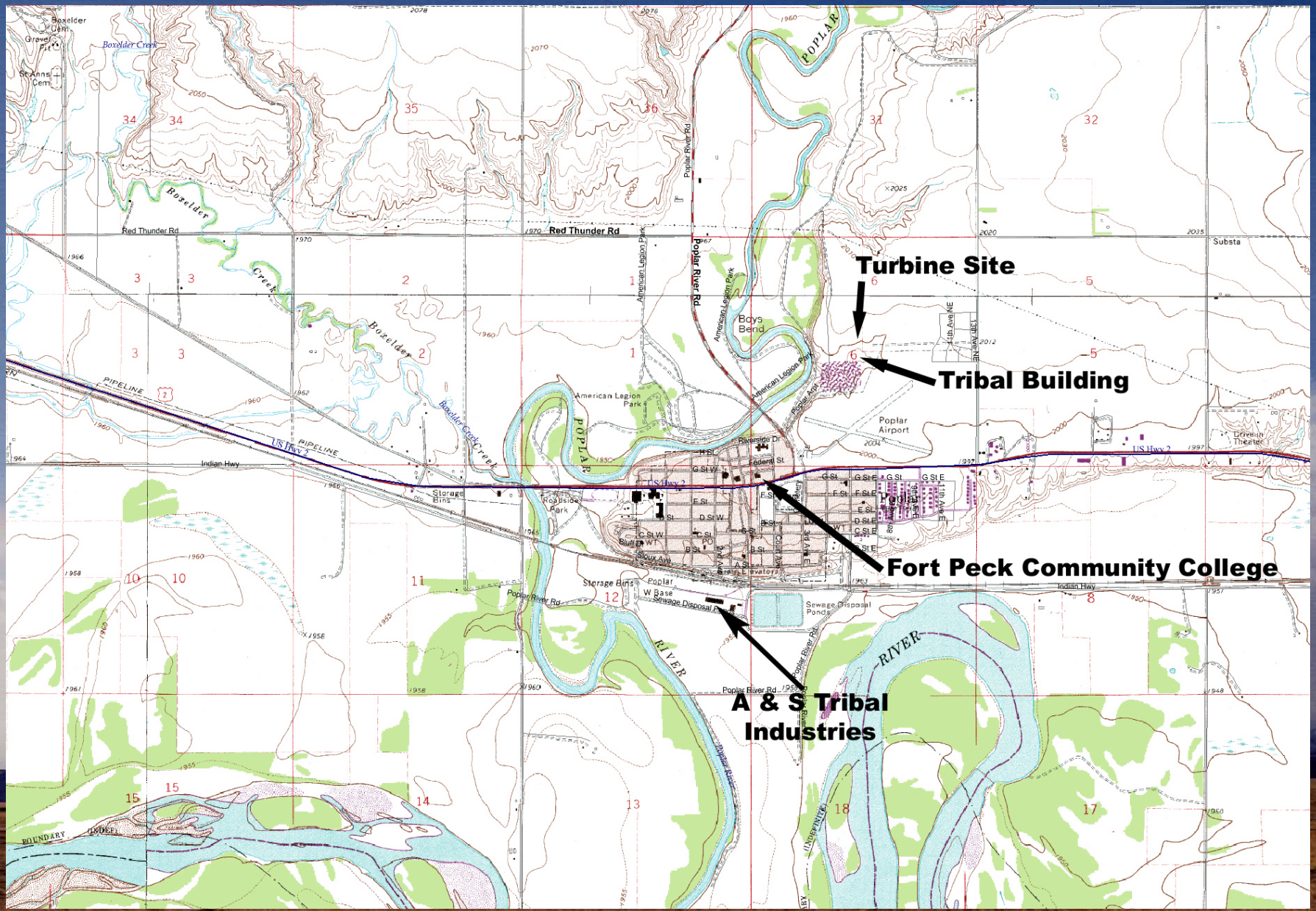
PROJECT OVERVIEW

Buy and Install a Vestas V47-660kw Wind Turbine

Direct Connect / Net Meter the Project to 3 Tribal Buildings

Use the Resulting Electricity Savings to Develop and Implement Tribal Socio-economic Programs

Use the Retail Green Tag Sales to Maintain the Turbine and Create a Tribal Energy Efficiency Program



Foundation for the American Indian

Tribal Demographics for the Assiniboine Sioux Tribes at Fort Peck

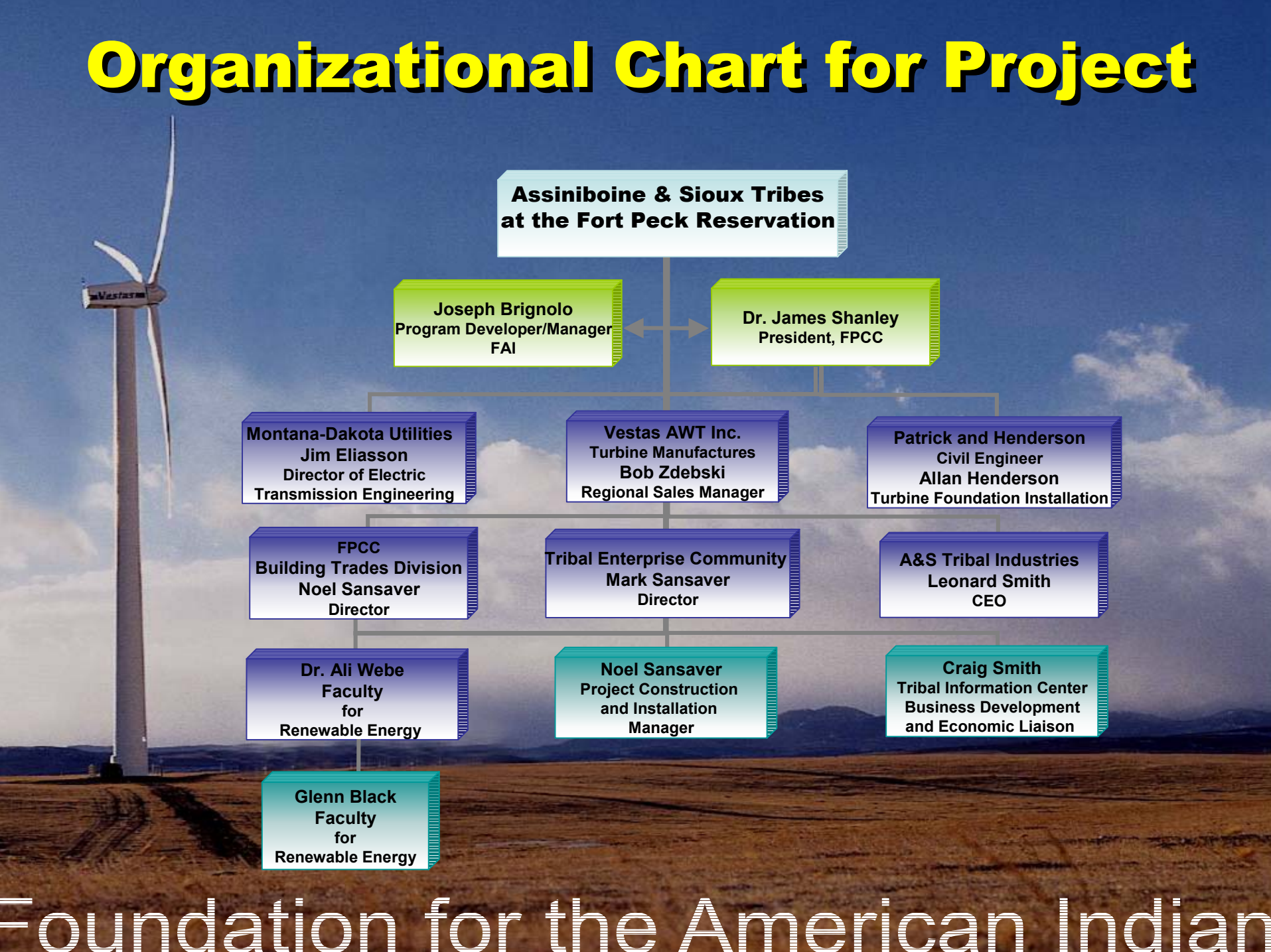
Total area	2,093,318 acres
Tribally owned	935,000 acres
High School graduate or higher	61.4%
Bachelor's deg. or higher	5.9%
Per capita income	$4,778.00
Total labor force	2,003
Unemployment rate	76.0%
Total reservation population	10,722

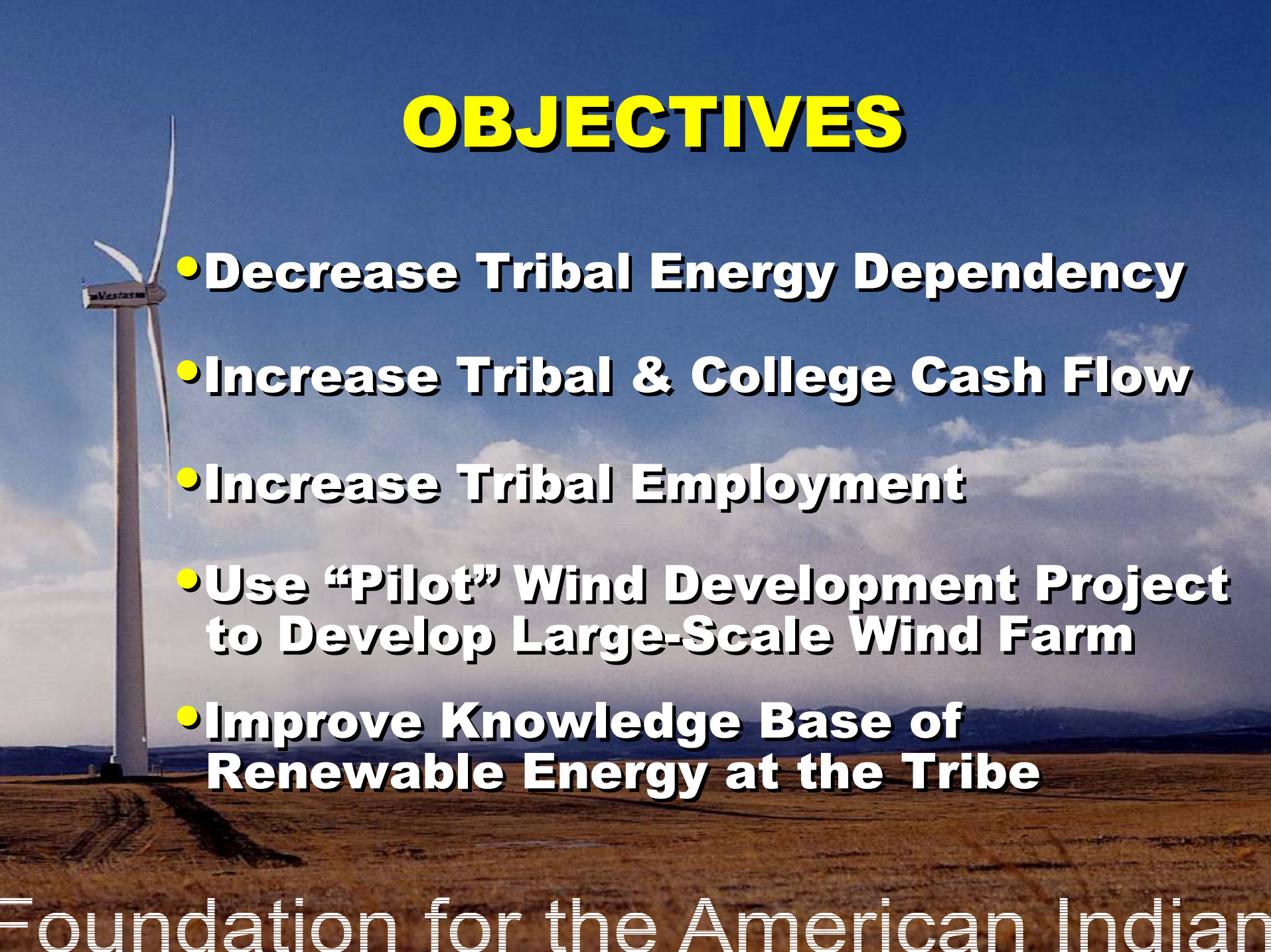
PROJECT PARTICPANTS

- Department of Energy / NREL
- Fort Peck Community College
- Foundation for the American Indian
- Vestas American Wind Turbines
- Florida Power and Light Energy
- Patrick and Henderson
- Barnhart Crane and Rigging Company
- Montana-Dakota Utilities
- Roosevelt County
- Trucker's Express

Foundation for the American Indian

Organizational Chart for Project



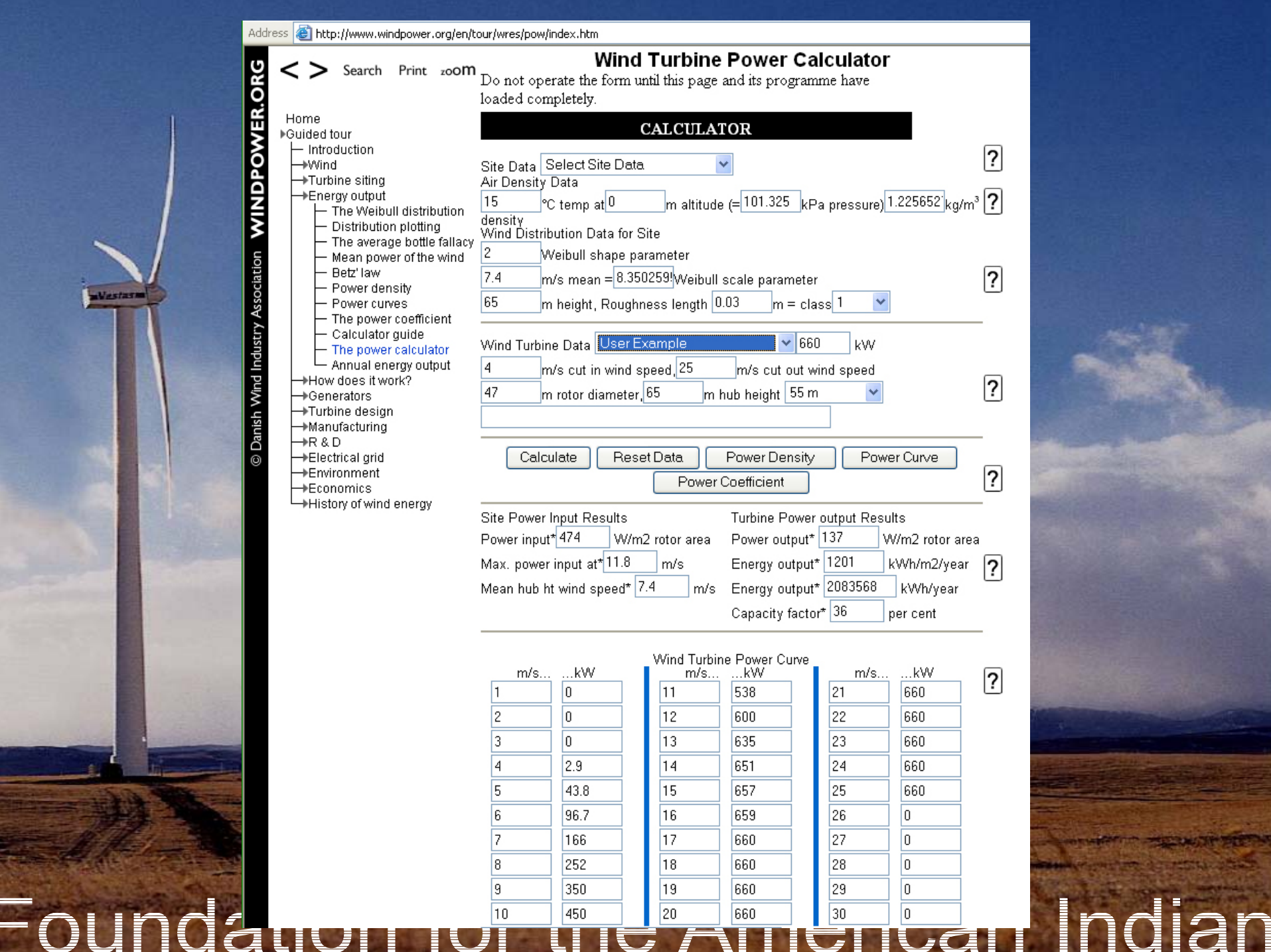


OBJECTIVES

- Decrease Tribal Energy Dependency
- Increase Tribal & College Cash Flow
- Increase Tribal Employment
- Use "Pilot" Wind Development Project to Develop Large-Scale Wind Farm
- Improve Knowledge Base of Renewable Energy at the Tribe

APPROACHES

- Reallocating Project Electrical Savings
- Establish a Renewable Energy Curriculum at FPCC
- Market Real-Time Green Tags at ***Retail***
- Continue to Develop Our Working relationship with MDU
- Develop Technical Workforce



Address http://www.windpower.org/en/tour/wres/pow/index.htm

WINDPOWER.ORG © Danish Wind Industry Association

< > Search Print zoom

- Home
- Guided tour
  - Introduction
  - Wind
  - Turbine siting
  - Energy output
    - The Weibull distribution
    - Distribution plotting
    - The average bottle fallacy
    - Mean power of the wind
    - Betz' law
    - Power density
    - Power curves
    - The power coefficient
    - Calculator guide
    - The power calculator
    - Annual energy output
  - How does it work?
  - Generators
  - Turbine design
  - Manufacturing
  - R & D
  - Electrical grid
  - Environment
  - Economics
  - History of wind energy

Wind Turbine Power Calculator

Do not operate the form until this page and its programme have loaded completely.

CALCULATOR

Site Data: Select Site Data

Air Density Data

15 °C temp at 0 m altitude (= 101.325 kPa pressure) 1.225652 kg/m³ density

Wind Distribution Data for Site

2 Weibull shape parameter

7.4 m/s mean = 8.350259 Weibull scale parameter

65 m height, Roughness length 0.03 m = class 1

Wind Turbine Data: User Example 660 kW

4 m/s cut in wind speed, 25 m/s cut out wind speed

47 m rotor diameter, 65 m hub height 55 m

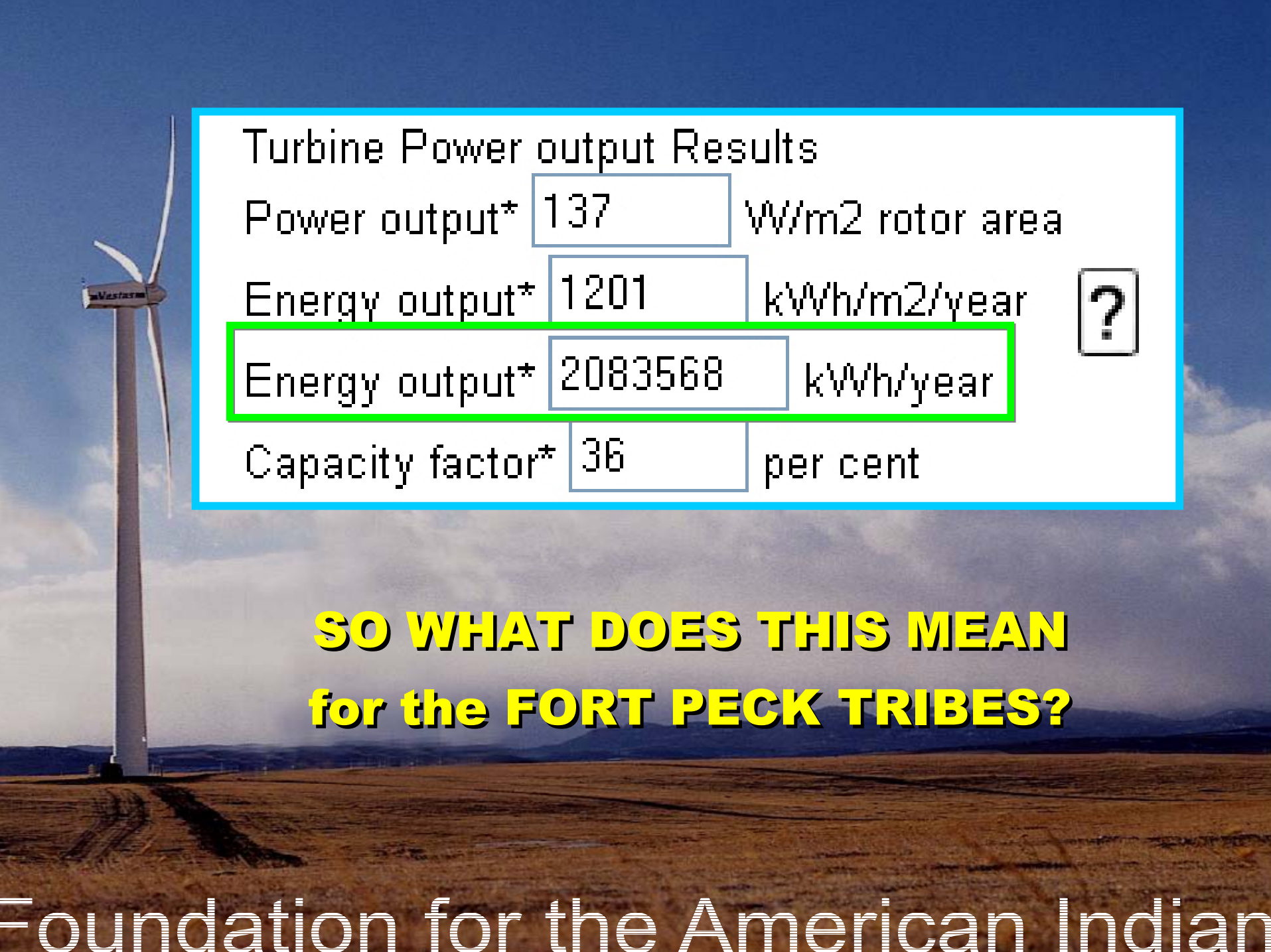
Calculate | Reset Data | Power Density | Power Curve | Power Coefficient

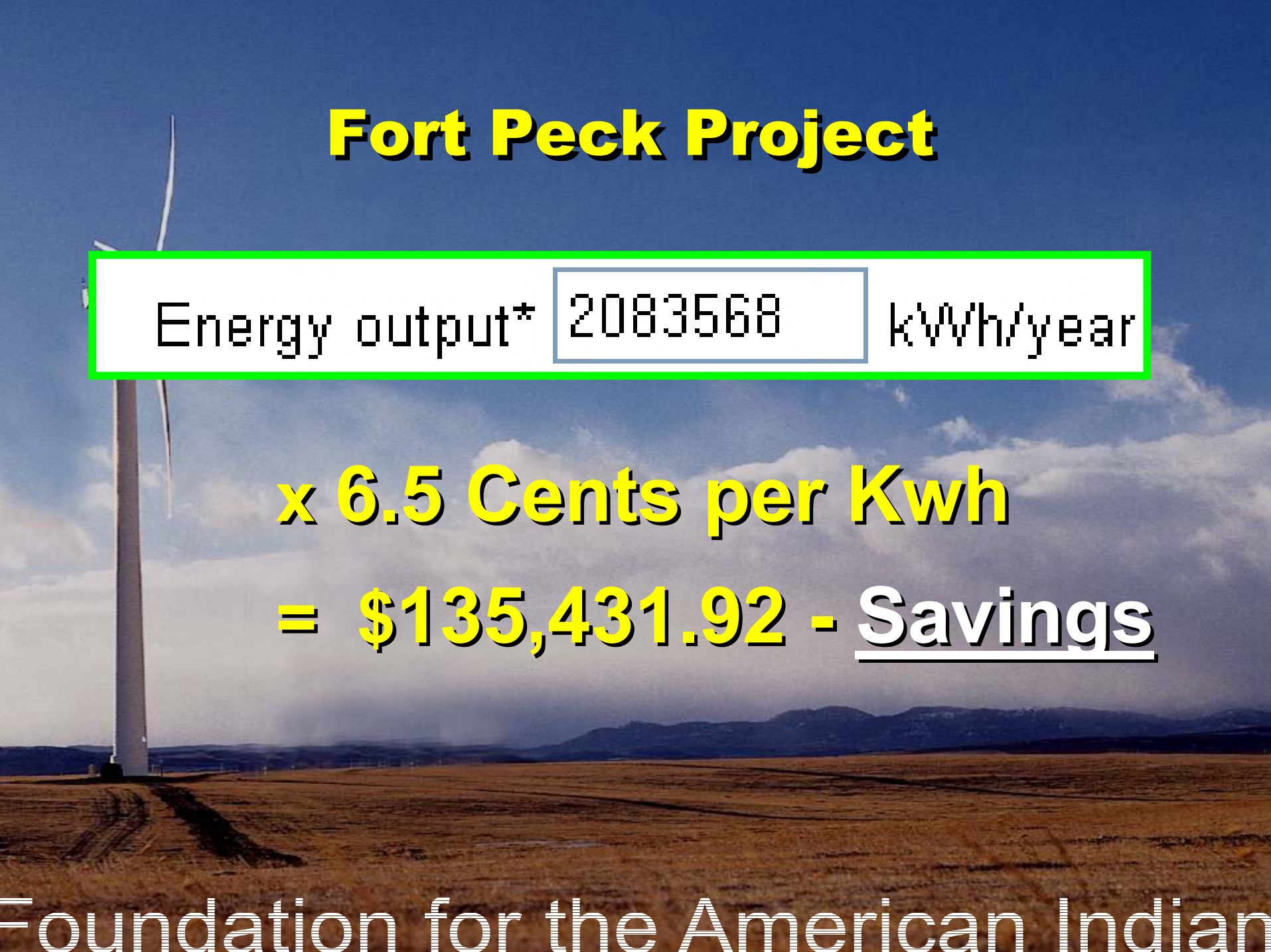
Site Power Input Results		Turbine Power output Results	
Power input*	474 W/m2 rotor area	Power output*	137 W/m2 rotor area
Max. power input at*	11.8 m/s	Energy output*	1201 kWh/m2/year
Mean hub ht wind speed*	7.4 m/s	Energy output*	2083568 kWh/year
		Capacity factor*	36 per cent

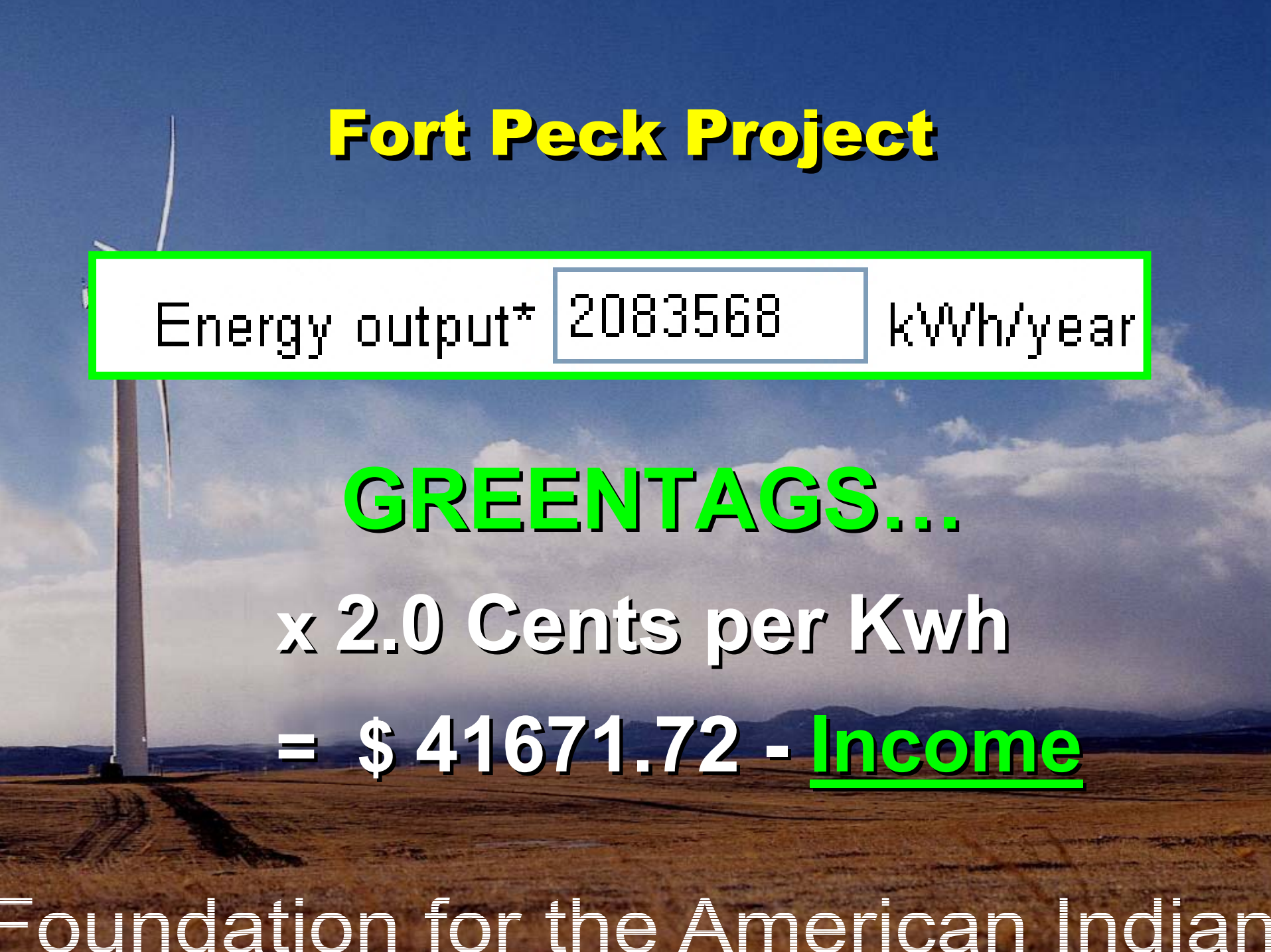
Wind Turbine Power Curve

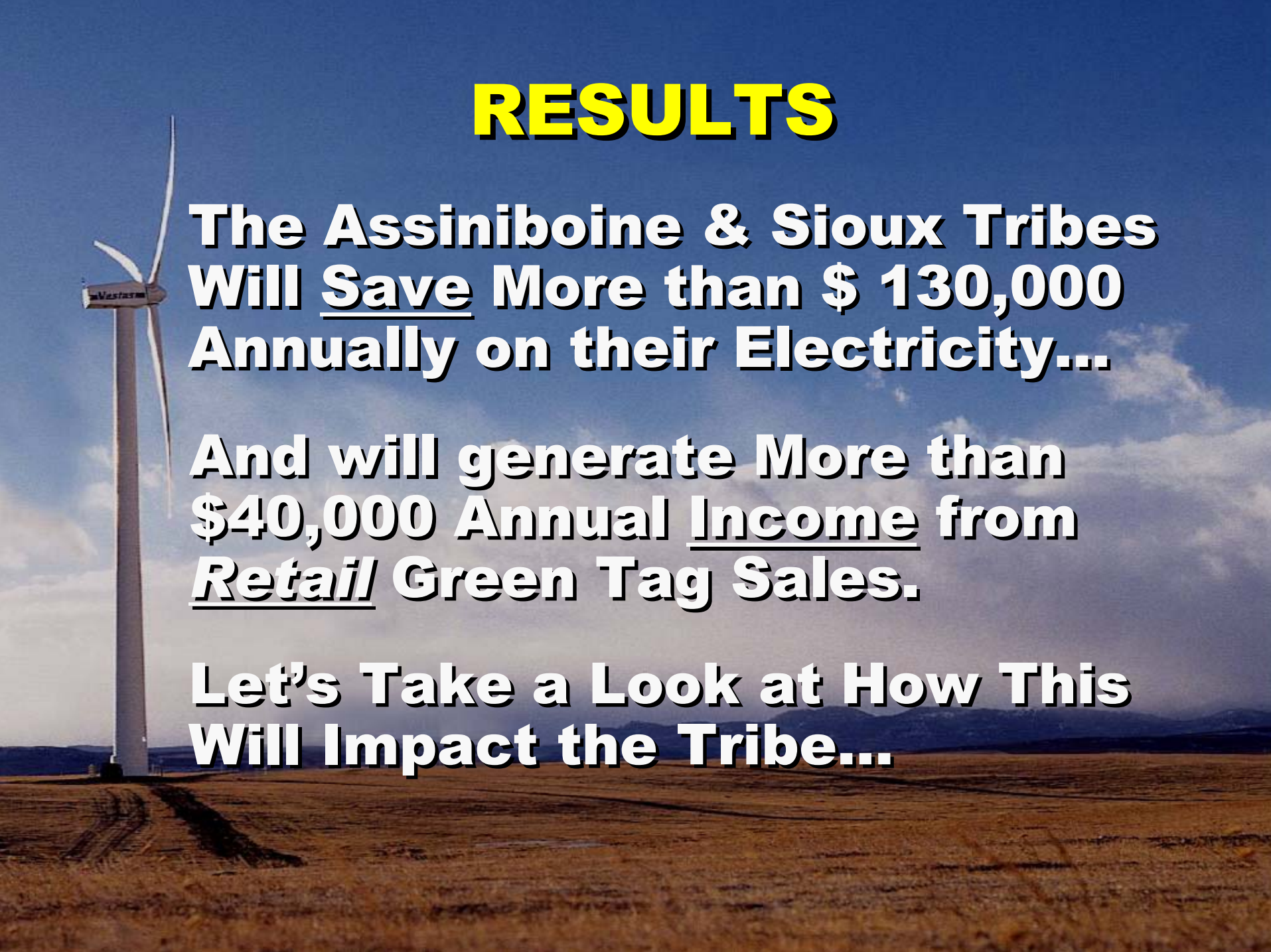
m/s...	...kW	m/s...	...kW	m/s...	...kW
1	0	11	538	21	660
2	0	12	600	22	660
3	0	13	635	23	660
4	2.9	14	651	24	660
5	43.8	15	657	25	660
6	96.7	16	659	26	0
7	166	17	660	27	0
8	252	18	660	28	0
9	350	19	660	29	0
10	450	20	660	30	0

Foundation for the American Indian


Turbine Power output Results
Power output* 137 W/m2 rotor area
Energy output* 1201 kWh/m2/year
?
Energy output* 2083568 kWh/year
Capacity factor* 36 per cent
SO WHAT DOES THIS MEAN
for the FORT PECK TRIBES?
Foundation for the American Indian


Fort Peck Project
Energy output* 2083568 kWh/year
x 6.5 Cents per Kwh
= $135,431.92 - Savings
Foundation for the American Indian


Fort Peck Project
Energy output* 2083568 kWh/year
GREENTAGS...
x 2.0 Cents per Kwh
= $ 41671.72 - Income
Foundation for the American Indian

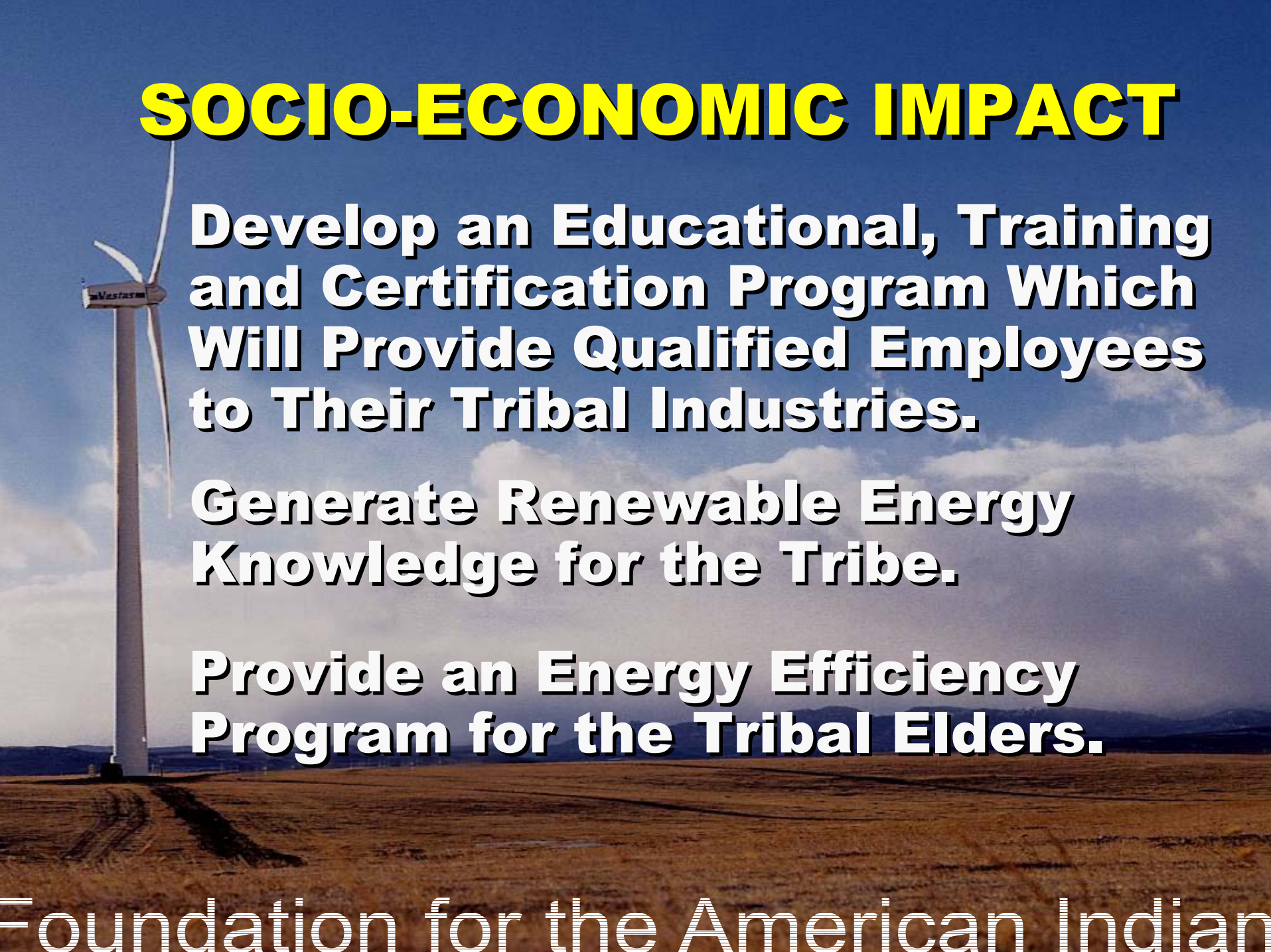


RESULTS

The Assiniboine & Sioux Tribes Will Save More than $ 130,000 Annually on their Electricity…

And will generate More than $40,000 Annual Income from *Retail* Green Tag Sales.

Let's Take a Look at How This Will Impact the Tribe…



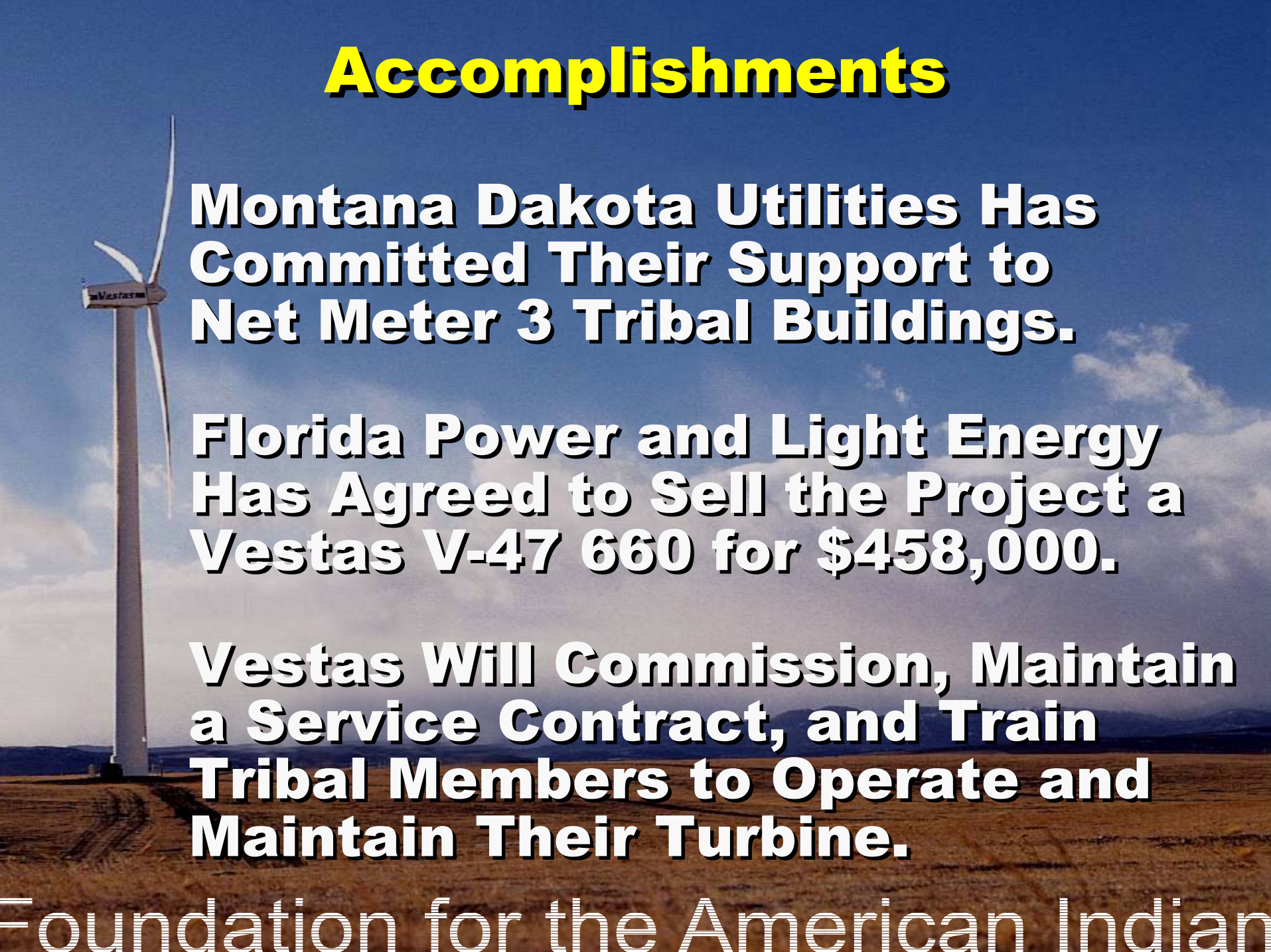
SOCIO-ECONOMIC IMPACT

Develop an Educational, Training and Certification Program Which Will Provide Qualified Employees to Their Tribal Industries.

Generate Renewable Energy Knowledge for the Tribe.

Provide an Energy Efficiency Program for the Tribal Elders.

Accomplishments



Montana Dakota Utilities Has Committed Their Support to Net Meter 3 Tribal Buildings.

Florida Power and Light Energy Has Agreed to Sell the Project a Vestas V-47 660 for $458,000.

Vestas Will Commission, Maintain a Service Contract, and Train Tribal Members to Operate and Maintain Their Turbine.

Technical and Management Issues

- NEPA Compliance
- Soil Samples
- Foundation Design
- Weather Cooperation
- Turbine Delivery and
- Crane Schedule (Lifting/Rigging)
- Interconnect
- Socio-economic Programs
- Web Site Development

Current and Future Activities

- Permitting
- Interconnect Agreement
- “Green-e” Certification
- Retail Sales of Green Tags
- Renewable Energy Curriculum
- Contract Negotiations
- Web Site Development

Future Plans

- Project Expansion
- Wolf Point Turbine
- Native American *Real-Time* Green Tags Marketing Company
- Replicating the FPCC and TMCC Projects at other Tribal Colleges
- Provide Assistance to the State of Montana for Renewable Energy

Joseph Brignolo

Vice President, Operations and Program Development, FAI

Project Manager/Technical Director, Fort Peck Wind Development Project